Basavarajeswari Group of Institutions

2024 SCHEME

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN | | | | | | | | | | |

Course Code | M | M | C | A | 3 | 1 | 1 | C |

Third Semester MCA Degree Examinations, January 2026

DEEP LEARNING

Duration: 3 hrs **Max. Marks: 100**

Note: ***1. Answer any* FIVE *full questions, choosing* ONE *full question from each module.***
2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO: PI)*
		MODULE – 1		
1.	**a.**	Explain the concept of a neural network and discuss its advantages and limitations.	**10**	**(2:1:1.4.1)**
	b.	Illustrate the basic components of a neuron and describe the process of signal transmission.	**10**	**(3:1:1.4.1)**
		(OR)		
2.	**a.**	Explain different types of neural network architectures with suitable illustrations.	**10**	**(2:1:2.5.2)**
	b.	Describe Rosenblatt's perceptron model and demonstrate the perceptron convergence theorem with an example.	**10**	**(3:1:2.5.2)**
		MODULE – 2		
3.	**a.**	Explain how introducing hidden layers in a Multilayer Perceptron (MLP) overcomes the limitations of a single-layer perceptron.	**10**	**(2:2:1.4.1)**
	b.	Illustrate the learning process in a MLP with a step-by-step example.	**10**	**(3:2:1.4.1)**
		(OR)		
4.	**a.**	Discuss the importance of weight initialization and learning rate during training of neural networks with examples.	**10**	**(2:2:2.5.2)**
	b.	Explain the XOR problem and demonstrate how an MLP solves this limitation of single-layer perceptron's.	**10**	**(3:2:2.5.2)**
		MODULE – 3		
5.	**a.**	Define overfitting and underfitting in machine learning models and provide examples for each.	**10**	**(2:3:1.4.1)**
	b.	Explain regularization in deep learning and illustrate why it is needed during model training.	**10**	**(3:3:1.4.1)**
		(OR)		
6.	**a.**	Explain the main causes of overfitting in deep neural networks with examples.	**10**	**(2:3:2.5.2)**
	b.	Differentiate overfitting and underfitting in terms of training and test performance with suitable illustrations.	**10**	**(3:3:2.5.2)**

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**

MODULE – 4

7.	**a.**	Explain the motivation behind introducing convolutional neural networks in deep learning.	**10**	**(2:4:1.4.1)**
	b.	Illustrate why fully connected neural networks struggle with image data.	**10**	**(3:4:1.4.1)**

(OR)

8.	**a.**	Explain how CNNs reduce the number of parameters compared to fully connected networks.	**10**	**(2:4:2.5.2)**
	b.	Describe local receptive fields and explain their significance in CNNs.	**10**	**(3:4:2.5.2)**

MODULE – 5

9.	**a.**	Define memory in machine learning models and explain its necessity for sequential data.	**10**	**(2:5:1.4.1)**
	b.	Explain sequential data and illustrate why the order of elements is important.	**10**	**(3:5:1.4.1)**

(OR)

10.	**a.**	Explain unfolding through time in RNNs and illustrate its importance for sequence processing.	**10**	**(2:5:2.5.2)**
	b.	Illustrate why traditional machine learning models fail to handle sequential data effectively.	**10**	**(3:5:2.5.2)**

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Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator)**